IEEE Committee 802: 1981 - 1982

🌐 **historyofcomputercommunications.info**/section/11.9/ieee-committee-802-1981-1982

Chapter 11 - Standards: An Enabling Institution 1979-1984

11.9 IEEE Committee 802: 1981 - 1982

The life-saving reorganization of IEEE Committee 802 in December 1980 to create two standards - token passing and CSMA/CD - eased immediate tensions without solving fundamental problems. The token-bus and token-ring factions had combined solely to fight adoption of CSMA/CD; papering over substantive differences. Since the token and CSMA/CD standards had to advance in unison - according to IEEE 802 rules - the token coalition erected numerous hurdles to the better-prepared CSMA/CD community. The reorganization also spawned an unintended consequence: Committee 802's struggles to define LAN standards became newsworthy. The larger technical/commercial communities would scrutinize future actions of Committee 802 as never before by. LAN standards had become important.

A disappointed Graube, founder and chairman of Committee 802, had witnessed his goal of one standard compromised away and knew if he didn't assert the authority of his office, the slippery slope of fractious debate might preclude any standards. Seeking to understand the progress of the subcommittees in an effort to focus future meeting agendas, he remembers:

> I simply asked each of the people that were working on documents to give me what they had. I took them all back to Tektronix and I put together a composite document, our first Draft A, and it was a total mess. You could see that there just wasn't any standard whatsoever. All we were doing was listing a catalog of the way you could do things, rather than the way you should do things.

A mess or not, in May 1981, Draft A represented Committee 802's stake in the ground, or more aptly, a mirage on shifting sands. Work on a next version began immediately.

The obvious lack of convergence induced growing concern within NBS and Xerox whether Committee 802 could create standard(s). NBS, having already decided in favor of CSMA/CD, feared delays and further compromises might lead to a standard not to their liking. To rally support for CSMA/CD, and prove it was more than the stepchild of DIX, NBS turned again to ECMA, the organization that had been so constructive in working towards an OSI Class IV protocol.44 Meanwhile, Xerox had been lobbying Siemens to become a reseller of its soon-to-be introduced Star workstation. As Siemens' interests in reselling Xerox's Star grew, so did its interests in having ECMA adopt a CSMA/CD standard equivalent to Ethernet, the LAN integrated into the Star. Siemens consequently began promoting a CSMA/CD standard within ECMA.

As for Committee 802, if its internal contortions did not cloud the future of LAN standards enough, a steady stream of new LAN technology announcements, all claiming superiority over those being debated within IEEE 802, were reported by the press.[45] No announcement caused more problems than that of Wangnet by Wang in June 1981.[46] A leader in word processing and office automation, Wang had enough market power to cause a stir with every new product announcement and Wangnet was no exception. By reshuffling the very technologies considered by Committee 802, Wangnet seized instant credibility and disrupted the existing standards debates. Like the token bus proposed by the PROWAY supporters, Wangnet was a broadband network. Carved out of its enormous bandwidth was a 12 megabits per second CSMA/CD channel, rather than the 10 megabits per second of Ethernet. In addition, Wangnet promised channels carrying voice, video, and even traditional point-to-point data communications. In short, Wangnet promised something for everyone.[47] Wang promised delivery ranging from February to October 1982.

The Wangnet announcement highlighted why Committee 802 needed to publish LAN standards as soon as possible. In mid-1981 that meant transforming the Draft A mess into a Draft B that could be submitted for membership voting. Seeking help from others, Graube remembers his frustrations with ISO:

> I don't think the ISO people knew what they were doing, because at times, we would ask for their guidance, in terms of how we described these standards, the Reference Model It was a mess, trying to track what they were doing, using them as guidance.

Wang's announcement created problems for IBM as well, and that in turn created additional problems for Committee 802. The superficially aligned token factions now found the antagonistic IBM and Wang under the same roof. Robert Donan, who had been recruited out of retirement by IBM in early 1981 to organize its LAN standards-making efforts, held the title of 'Standards Project Authority.' Donan's career included leading the team that announced SDLC in 1969 and years of experience beginning with the SDLC/HDLC standardization process and interfacing with ECMA, CCITT and ISO.[48] He knew a priority was to create an insurmountable distinction between token ring and token bus. He remembers the impossible bedfellows in the fall of 1981:

> It turned out that, just constantly, the needs of token ring and token bus were divergent. The token ring people saw a very fancy priority scheme, for instance, which is in token ring today, with which you can do all sorts of weird and wonderful things that aren't even possible in token bus. This has to do with the nature of everything going by every station, which is true for token ring and not for token bus. If you say; 'Make ring and bus look alike,' what you do is reduce it to one common denominator, and you get the worst of both worlds.

The illusion of one token standard, created as an artifice to defeat CSMA/CD, was destined to collapse, hastened by the market entry of Wang.

Finally in October 1981, Committee 802 published a 400-page Draft B to a waiting and critical audience. Doubters argued its certain failure: too many details and too many options.

The supporters of Ethernet again felt frustrated that the passage of their standard was being held up by the need of a parallel token passing standard. How could they put pressure on Committee 802 to pass a CSMA/CD standard equivalent to the Blue Book? For help they once again appealed to ECMA members. In November 1981, their efforts paid off when ECMA created technical group TG LN under Technical Committee 24 to develop LAN standards.

At the December Committee 802 meeting, the incompatibilities between token bus and token ring (accentuated by animosities between IBM and Wang) led to a reordering of the standards-making efforts from CSMA/CD and tokenism to bus and ring.[49] Token bus was argued to be more aligned with CSMA/CD; itself a bus-based technology proven to work over a broadband cable like token bus.[50] What better logic than grouping bus-based LANs that could be baseband-CSMA/CD or broadband-token bus; and token ring-based LANs?[51]

The orthogonal leap in LAN argument created both confusion and an ensuing war of words of baseband vs. broadband. It now pitted DIX against Wang instead of IBM against Wang.

Jerry McDowell, who had attended IEEE 802 meetings from the very beginning, joined Wang in late 1981 to assume responsibility for all communications technologies, including Wangnet. He remembers the war of words that engulfed LANs for years:

> What tended to happen was that every time that there was a trade show, I'd get invited to speak about broadband and Liddle or Bell would be talking about the baseband technology and the press wars were Baseband vs. Broadband. Which is Better? And we'd cast spears at each other, and I'd say, 'Look, on broadband I can do video and I can do voice and I can do data,' and they'd turn around and say, 'Yeah, but who needs it?'

With Draft B assumed all but dead, and ECMA rumored to be closing in on LAN standards, and the Committee 802 again reorganizing, standards-creating by Committee 802 appeared to be unraveling once again. Loughry, of HP and leader of the CSMA/CD camp, opines:

> Dissension was appearing in the ranks. There was bad press at that time that IEEE 802 was going nowhere, nobody could agree, etc. Well, this was because we were not abiding by our own rules. We were just really not doing things in a healthy technical way, or a healthy political way. We were not a democratic group at one time in our history.

Graube recalls:

> I'd toss and turn at night and go to those meetings like going off to wars.

In February 1982, Committee 802 met under intense pressure to hammer out a passable Draft C. Drafts A and B had been works-in-process circulated to solicit feedback that could be incorporated into the eventual standards. Such an iterative approach now seemed slow and indecisive however. The time had come to specify standards: period. To do so seemed impossible if they had to hold to their original and lofty goal of having all access methods – CSMA/CD, token bus, and token ring – operate over all media, e.g. baseband and broadband cable, twisted pair wiring and fiber optics. An expedient solution coming out of December's reorganization, and confirmed by market behavior, was to associate each access method with a primary medium. While compromising the initial goal, it did look like a way to streamline the standards-making process. Hence, the baseband cable access method became CSMA/CD, broadband cable became token bus, and twisted-pair wiring became token ring. A path to standards seemed had been cleared.

In that same February meeting, the CSMA/CD standard moved further away from the DIX proposal. In Data Communications in March 1982, Graube judged the two CSMA/CD proposals:

> Total incompatibility

Then later in February 1982, the tug-of-war to define a CSMA/CD standard intensified. ECMA's TG LN committee, that had worked in close cooperation with Xerox, DEC, Siemens and Olivetti, completed a draft CSMA/CD standard closer to DIX's Blue Book than the Committee 802 proposal that was diverging from the Blue Book. Adding even more pith to DIX's call for an Ethernet standard, 24 companies made public their intention to introduce Ethernet products.[52]

If Committee 802 members felt they had finally resolved the roadblocks to standards, it must have been a shock to read the headline of a Data Communications March editorial Viewpoint: "The grim tale of a standards committee that has lost sight of its role and its importance." Disparaging the proposal of associating each access method with a primary medium, the editorial ended with:

> Before the IEEE 802 committee is guilty of trying to engineer a giant leap backwards, it ought to think through the consequences of its proposal. If approved, it will shine as the brightest example ever of a non-standard standard. If rejected – as well it should be – the committee will move even further away from its once universally held posture of seriousness.

An article in that same issue of Data Communications was titled: "Local network standards: No utopia.'[53] It warned of the need for market acceptance:

> The buyer well knows that many major high-technology innovations have been made commercial successes not by established giants, but by start-up ventures. Therefore buyers who have to select a local network product will not have their prayers answered by standards-making bodies. Those who are not early adopters will wait for marketplace standards no matter when the 802 or any other committee formulates standards.

With the institutional legitimacy of Committee 802 at risk, 22 members, including all committee chairmen but not Graube or Rosenthal, drafted a response published in the April Data Communications Viewpoint. In it, they argued of the enabling role of standards to encourage VLSI semiconductor manufacturing to achieve lower cost LAN chips:[54]

> The solution to the volume problem is, of course, the development of appropriate standards that not only enable equipment of varying manufactures to intercommunicate but provide the volume by narrowing the alternatives – and thus the raison d'être for IEEE Project 802.

The critical press and undeniable confusion belaboring LAN standards caused problems for more than Graube and Committee 802. Bell of DEC remembers many testy meetings justifying DEC's involvement in the fight for a CSMA/CD standard:

> I said: 'Hey, we've got to have it. It's just a wire that connects all these things. No big deal.' Meanwhile the press is raising hell. I said: 'Nothing's happening here. It's nothing. I don't know if this stuff will ever be important, but we need to connect machines together.' The Operations Committee kept saying: 'Why are we giving this to the world?' I said: 'Wait a minute. We're not giving anything to the world. We don't have a protocol, we don't happen to have the patent on either CSMA/CD or the ring.

In March 1982, Committee 802 met again to resolve impasses to completing Draft C.[55] Four technical presentations by IBM personnel clarified its view of token ring technology and provided the data needed to specify a standard: one logjam broken. Equally, the actions of ECMA gave impetus to create a CSMA/CD standard close to the Blue Book, the opposite of what had been decided in February. Many, including Donan, viewed the actions of ECMA as an "end run"[56] around Committee 802 with the intent to force conformance to its, and essentially the Blue Book's, Ethernet. It proved successful. Committee 802 once again acted to preserve its institutional legitimacy and changed its standard to conform to the proposal of ECMA.

Graube remembers that IEEE 802:

simply bit the bullet and said: "OK, let's move over to the ECMA position," and that's the kind of technology that was incorporated in the IEEE 802.3 standard. It's basically as a result of this process of accommodating these different views. In my opinion, I think we did things which could have been done differently, which could have been done better. Of course, I'm an engineer, so I don't know what's better, but there were things done which were a compromise.

Even while Committee 802 lurched to a Draft C, Graube and Rosenthal huddled, anxious to end the committee's meanderings. Influencing them were the suggestions accompanying many of the B votes to approve three or even four standards. ,57 (Thus, the willingness of Graube to accede to the standards proposals of February.) Rosenthal remembers their conversation when they accepted the inevitability of three standards: CSMA/CD, token bus and token ring:

> Maris and I had long conversations about how to get rid of the personality problems and focus more on an organization and structure that would support outputs that we would be proud of, rather than the in-fighting. So we had to get rid of that old structure. We had to put in place an infrastructure that would be conducive to making real things happen. As a matter of fact, I remember, it was a cold, windy night in Minneapolis when we did that. We were just walking around the lake, and we figured out how to do that. We asked John Riganetti, a division chief at NBS and who was very close to the people in New York who were the movers and shakers in the IEEE, to help us orchestrate this new change that we wanted to put in place in 802. He taught us how to do that, really helped us do that, and we did it very successfully.

Graube remembers the challenges of restructuring IEEE 802 to reflect three standards:

> I can remember having heart-to-heart talks with some of the opponents of this particular scheme of doing things, because they were losing their jobs as chairmen of these groups, which was not something they liked to do, nor was it easy for me to disenfranchise them, but it was something that needed to be done.

Bolstering his courage and logic was the likelihood of IBM- and DIX-created standards. In June, for example, ECMA ratified a LAN standard very close to the DIX proposal by a vote of 13-2, including the affirmative vote of IBM.58 (IBM voted for a DIX-like CSMA/CD with the tacit agreement that it would receive similar support for its LAN standard when announced – a date not yet set.)59 That same month, DEC publicly announced its plans to deliver Ethernet products compatible with the Blue Book.60 In July 1982, 19 companies announced public support for the ECMA CSMA/CD standard.61 The press also reported Ethernet semiconductor chip announcements, or rumored announcements, by Intel, Seeq, Ungermann-Bass, Advanced Micro Devices and Mostek.62

The behind-the-scenes effort to reorganize Committee 802 proved timely as de facto Ethernet standardization again challenged Committee 802's role and authority. At the August meeting, the results of the voting on Draft C were reported. CSMA/CD received more than the needed three-fourths majority, as did token bus.63 Token ring came close, 73 percent, but needed another vote to pass. A proposal was then made by DIX to reorganize into three standards-making efforts: CSMA/CD, token bus and token ring.64 Each of the three standards would share a common link layer protocol, although the definition would differ from that being created within OSI. Furthermore, the three standards subcommittees would act independently. Loughry recalls:
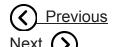
> Then we said things like: 'The plenary is no longer a decision making body.' We used to have plenary votes, in which the plenary of two hundred people would try to vote on issues, and – you just don't have knowledgeable voting in a large body that only comes together for a few hours at the beginning and the end of the session. So, the plenary, then, was just dissemination of information, status reporting, and each of the individual committees really did the voting, and the executive committee would either affirm or deny what the working groups brought forward. So there was accountability to a higher group, but anybody in 802 could object to either the working group chairs or to the executive committee. We built in what you'd expect of normal, reasonable democratic process.

The new subcommittees became: link layer (802.2), CSMA/CD (802.3), token bus (802.4) and token ring (802.5). Loughry became Chairman of 802.3, Donnan of 802.5, and Dave Carlson of AT&T 802.2. A succession of chairmen headed 802.4. Along with the reorganization, the decision was made to resubmit all three standards to another vote in hopes of improving the acceptance level of all. (The vote would only be on the proposed changes however.)

Then out of left field, Olaf Soderblom, a Swedish citizen, pronounced he held a U.S. patent issued in 1980 for a token-passing networking scheme covering the token ring under consideration.65 IBM, in fact, had already paid him $5 million for an unlimited license for future use.66 If uncertainty had clouded past token ring discussions, then Soderblom's thunderclap rained darkness over its future.

In November 1982, DIX released version 2.0 of its "Blue Book" Ethernet to reflect changes from the many months of negotiations with Committee 802 and ECMA. It then essentially conformed to Committee 802's Draft D. In December, at the meeting held at DEC, Committee 802 forwarded its CSMA/CD recommendation, standard 802.3, to the IEEE TCCC for approval. Both token bus and token ring required more work however.

Just as ECMA had placed pressure on Committee 802 to standardize a Blue Book-like CSMA/CD, the movement to complete the 802.3 standard along with the availability of TCP/IP and XNS exerted new pressures on OSI t o promptly adopt LAN protocol standards.